NOTES ON SOME WESTERN AUSTRALIAN FISHES.

By ALLAN R. McCULLOCH, Zoologist, Australian Museum.

PLATES IX. to XIII.; text-figures 1, 2.

The Australian Museum has received for identification a large collection of fishes from the Director of the Western Australian Museum and Art Gallery, while several smaller ones have been presented to the Trustees by Mr. A. Abjornssen, Chief Inspector of Fisheries, Western Australia. They include a considerable number of new and little-known species, of which some are dealt with in the following pages. Others not previously recognised from the Western State are recorded.

I wish to express my thanks to Mr. Bernard H. Woodward for enabling me to examine and write upon this extremely interesting collection, and also for various kindnesses connected with the publication of the paper. My thanks are also due to Mr. Abjornssen, who has made special efforts to secure several species I have particularly asked him for.

GONORRYNCHUS GREYI, Richardson.

Rynchana greyi, Richardson—Zool. Ereb. and Terr., 1845, p. 44, plate XXIX., figs. 1-6.

Gonorhynchus greyi, Günther—Brit. Mus Cat. Fish, VII., 1868, p. 373 (part); *Id.*, Castelnau, Proc. Zool. Soc. Vict., I., 1872, p. 182; *Id.*, Klunzinger, Arch. fur Nat., XXXVIII., 1872, p. 42, and Sitzb. Akad. Wiss. Wien., LXXX. i., 1879, p. 415; *Id.*, Macleay, Proc. Linn. Soc. N. S. Wales, VI., 1881, p. 255; *Id.*, Johnston, Proc. Royal Soc. Tasm., 1882 (1883), p. 132, and 1890 (1891), p. 37; *Id.*, Ogilby, Proc. Linn. Soc. N. S. Wales, XXIV., 1899, p. 154; *Id.*, Waite, Rec. Austr. Mus., III., 1900, p. 211.

Gonorhynchus gonorhynchus, Stead—Proc. Linn. Soc. N. S. Wales, XXXII., 1908, p. 744, and "The Beaked Salmon" (Dept. Fish. N. S. W.), 1908, pp. 1-8, plate 1; *Id.*, Zietz, Trans. Royal Soc. S. Austr., XXXII., 1908, p. 295

Gonorhynchus gonorynchus, Waite—Trans. N. Zeal. Inst., XLII., 1910, p. 374.

Gonorrynchus greyi, Ogilby—Ann. Queensl. Mus., No. 10, 1911, p. 34.

? Gonorrynchus forsteri, Ogilby—*Loc. cit.*, and synonymy.

I have compared three Western Australian examples with four others from New South Wales, one from Victoria, and twelve from Lord Howe Island, and find them to be identical. They all differ from Richardson's figure, however, in the proportional lengths of the head and pectoral fins. My series includes specimens from 86-255mm. long. The pectorals are from $2\frac{1}{4}$-$2\frac{3}{4}$ in their distance from the ventrals, not $3\frac{1}{2}$, as figured. The head varies from $4\frac{1}{4}$-$4\frac{3}{4}$ in the length to the hypural; in the figure it is almost six times. The insertion of the dorsal fin also is farther forward in my specimens than shown. It must be noted, however, that Stead figures New South Wales examples, the proportions of which approach Richardson's specimens, while they also agree very well with Hector's figure of one from New Zealand, which Ogilby has called *G. forsteri*.

It therefore seems to me that the length of the body is very variable, as in many other elongate fishes, and that *forsteri* must be regarded as a synonym of *greyi*. If this be accepted, the species is recorded from South-Western Australia, South Australia, Victoria, Tasmania, New Zealand, New South Wales, Lord Howe Island, and the Kermadecs.

Specimens of *G. parvimanus* (Ogilby),[1] of the same size as others of *G. greyi*, have very much smaller heads and pectoral fins, while the scales are cycloid instead of ctenoid. Waite[2] considers the one to be merely the young (larval form) of the other, and the close association of the two over a wide geographical area lends considerable support to the hypothesis. Specimens of the *parvimanus* form are recorded from the following localities:—Lord Howe Island and Narrabeen, New South Wales; Kermadec Islands[3]; Moreton Bay, Queensland. Another is in the Australian Museum from Manly, near Sydney.

The type, which is the largest specimen known, is 88mm. long.

[1] Ogilby. Ann. Queensl. Mus., No 10, 1911, p. 34.
[2] Waite. Rec. Austr. Mus., V., 1904, p. 147, plate XVII., fig. 3
[3] Waite. Trans. N. Zeal. Inst., XLII., 1910, p. 374.

GYMNOTHORAX WOODWARDI, sp. nov.

FIGURE 1.

Muraena nubila, Richardson—Zool Ereb. and Terr., Fishes, 1848, p. 81, part—specimen from Houtmans Abrolhos.

Muraena richardsonii, Günther—Brit. Mus. Cat. Fish, VIII., 1870, p. 118—same specimen (not of Bleeker).

Gymnothorax punctatofasciatus, Waite—Rec. Austr. Mus., VI., 1905, p. 58 (not of Bleeker).

Head $2\frac{2}{3}$ in the trunk; head and trunk $1\frac{1}{4}$ in the tail. Snout $5\frac{1}{2}$ in the head, mouth $2\frac{1}{5}$, eye $1\frac{2}{3}$ in the snout, and almost equal to the interorbital space.

Body compressed, snout pointed, the tip rounded. Teeth of adults uniserial in both jaws; they are small anteriorly in the upper jaw, then large, and decreasing again backwards. In a small example there are one or two large canines inside the others near the middle of the jaw. Mandibular teeth decreasing regularly from front to back. One or two large depressible teeth on the median line of the mouth anteriorly; vomerine teeth uniserial, small, and mostly rounded. Gill-opening smaller than the eye. Origin of the dorsal, midway between the end of the mouth and the gill-opening.

Colour.—Light brown after long preservation in spirits, darker posteriorly, with a wide meshed network of dark lines on the upper half of the body. A dark line near the back begins with the dorsal and follows it until it is lost on the tail; this line is not very distinct in my smallest specimen. Some black lines extend from behind the mouth towards the gill-opening; head otherwise plain. Anteriorly the dorsal and anal fins are marked like the body, but posteriorly they are very dark with whitish margins.

Described from five specimens, 325-720mm. long, from near Fremantle, Houtmans Abrolhos, and Pelsart Island. The type, which is 515mm. long, is from the latter locality, and is in the Western Australian Museum.

An eel in the British Museum, from Houtmans Abrolhos, was identified by Richardson as his *Muraena nubila*, and later by Günther as *M. richardsonii*, Bleeker; it is probably of the same species as the specimens described above. Mine differ from the figures of both *nubila* and *richardsonii*, however, in the arrangement of the dark marking

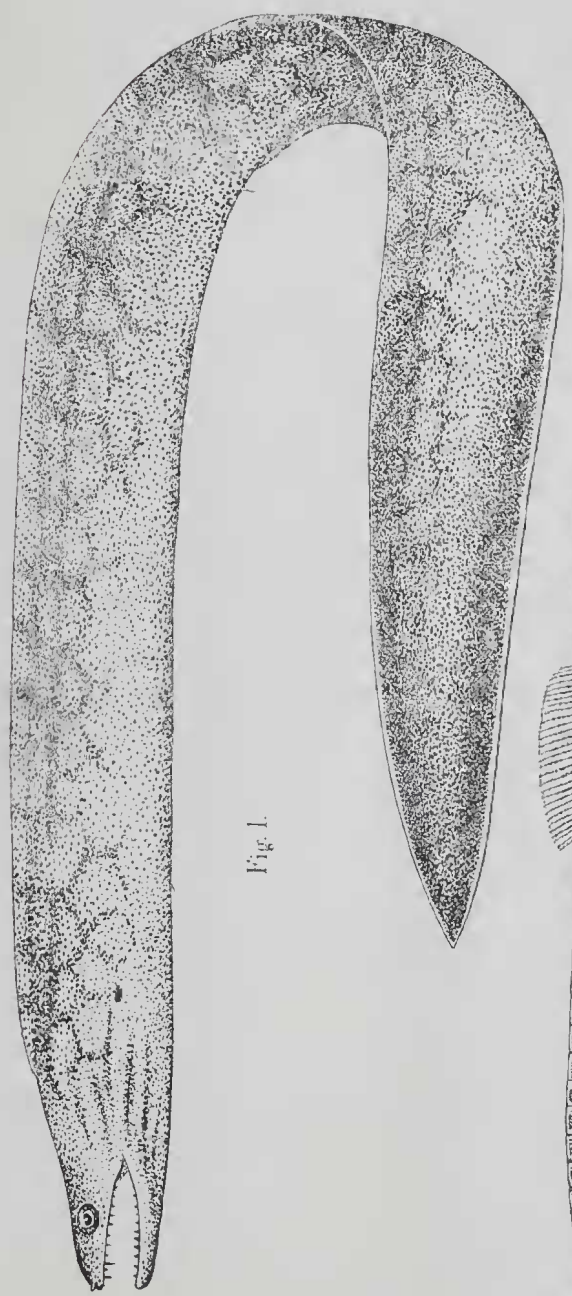

Fig. 1.

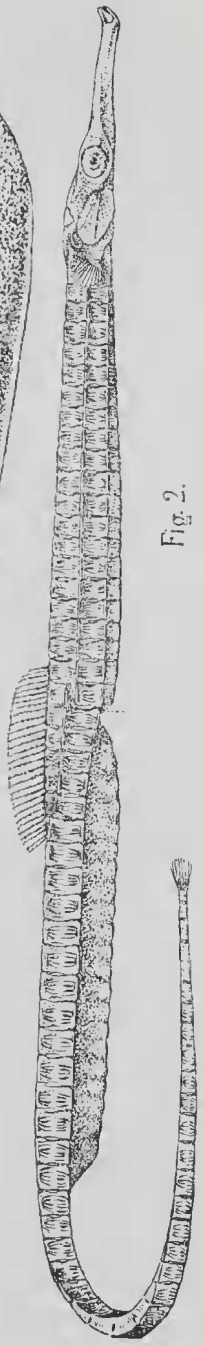

Fig. 2.

FIGS. 1 and 2.

on the body, which is apparently very characteristic. Again, my smallest specimen is one of the three identified by Waite as *Gymnothorax punctatofasciatus*, Bleeker; I consider that its colour pattern separates it from these species also.

CORYTHROICHTHYS POECILOLAEMUS, Peters.

FIGURE 2.

Syngnathus poecilolaemus, Peters—Monatsb. Akad. Wiss. Berlin, 1868 (1869), p. 458; *Id.* Zietz, Trans. Roy. Soc. S. Austr. XXXII., 1908, p. 298.

Syngnathus poekilolaemus, Duncker—Faun. Sudwest-Austr., II., 1909, p. 245 (see references).

D. 28. P. 12. C. 10. Rings 19+48. Head $1\frac{9}{10}$ in the trunk. Head and trunk $1\frac{1}{7}$ in the tail. Snout one third longer than rest of head. Eye less than one fourth as long as the snout, and 2 in postorbital portion of head.

Snout with ridges but not serrated; a median keel extends from the mouth to the occiput, but is very low anteriorly and is interrupted between the eyes. The supraorbital ridges commence some distance before the eyes, and extend backward to the occiput; interorbital space concave. Nuchal keel low but distinct. Operculum with a prominent median keel. Body rings without spines. Trunk $1\frac{1}{2}$ as deep as broad, its greatest depth being near the vent. Dorsal fin opposite the vent, occupying $1\frac{1}{2}+6$ rings; its base not raised above the level of the back. Median lateral ridge ending on the last body ring, and just below the origin of the upper caudal edge. Edges of the back extending to the end of the dorsal fin. Lower lateral edges of the body continuous with those of the tail. Caudal fin, small, shorter than the eye. Egg pouch very large, occupying 18 tail rings and containing 58 large eggs disposed in two, or in places, three rows.

Colour.—Uniform brown in spirit, the snout with darker cross bars. Body with numerous minute ocelli.

Described from a single example, 197mm. long, from Fremantle, and the property of the Western Australian Museum.

SYNGNATHUS (YOZIA) TIGRIS, Castelnau.

PLATE, XI.; FIG. 2.

Syngnathus tigris, Castelnau—Proc. Linn. Soc. N. S. Wales, III., 1879, p. 397; *Id.*, Macleay, *loc. cit.*, VI., 1881, p. 227; *Id.* Stead, *loc. cit.*, XXXI., 1906, p. 428; *Id.*, Duncker, Faun. Südwest-Austr. II., 1909, p. 245

D. 24-25. P. 15. C. 8. Rings 17+36. Head 3-3$\frac{1}{3}$ in the trunk. Head and trunk 1$\frac{2}{3}$ in tail. Snout 1$\frac{3}{4}$-1$\frac{6}{7}$ in rest of head. Eye 2$\frac{1}{3}$-2$\frac{3}{4}$ in snout, and 2 in postorbital portion of head.

Snout rugose but not serrated, with a median keel before the eyes which is more or less bifurcate between the eyes. Interorbital space concave. Head granular, operculum with radiating lines, but without a median keel. Occiput and nape with a sharp, raised keel; body rings without spines. Trunk deeper than broad, the breast more or less swollen; depth between the upper and lower lateral edges of the trunk rather less than the length of the snout. Dorsal fin opposite the vent, occupying 2$\frac{1}{2}$-3+2-2$\frac{1}{2}$ rings, its base elevated. Median lateral ridge continuous with the lower caudal edge; upper edge extending over 1-1$\frac{1}{2}$ body rings. Lower surface of the tail much broader than the upper. Caudal fin, large, two-thirds as long as the snout.

Colours.—Light brown in spirits, each ring with a more or less distinct ocellus above the lateral ridge, and on the sides of the tail; a dark-edged, semioval pearly spot on the edge of each body segment. Operculum with several oblique dark lines. Body with three darker cross bars, and tail with about seven more.

Described from three specimens 265-280mm. long, from Port Jackson, the largest of which is the specimen figured (Reg. No. 1. 12073).

A single specimen from Fremantle differs only in having the head more rugose, the opercular markings broader, and nine instead of seven cross bands on the tail.

According to Castelnau, the upper edge on the tail and the lateral line are continuous, but in all the specimens I have seen, the latter joins the lower edge above the vent. Through the kindness of Mr. Stead, I have examined the specimen he recorded from

the Hawkesbury River, while Mr. Ogilby informs me that according to his notes, the lateral ridge is always continuous with the lower caudal edge. I therefore regard the original description as incorrect in this detail.

CYPSELURUS KATOPTRON, Bleeker.

Exocoetus katoptron, Bleeker—Ned. Tydschr. Dierk., III., p. 115; *Id.*, Günther, Brit. Mus. Cat. Fish, VI., 1866, p. 289; *Id.* Bleeker, Atl. Ichth., VI., 1871, p. 72, pl. CCXLVII., fig. 3.

Cypsilurus katoptron, Jordan and Seale—Bull. U.S. Bur. Fish, XXV., 1906, p. 211, fig. 16.

A large specimen from Fremantle differs from Jordan and Seale's excellent figure only in having a slightly larger eye, and thirteen instead of fourteen dorsal rays, but in both these details it is in agreement with Bleeker's description.

It differs from Günther's description of *Exocœtus robustus* [1] in having the interorbital space concave instead of flat, and in the position of the ventral fin which is inserted farther back. Jordan and Seale consider *C. robustus* and *C. katoptron* identical, notwithstanding that Günther had Bleeker's type before him for comparison.

PARAPLESIOPS MELEAGRIS, Peters.

PLATE IX.

Plesiops meleagris, Peters—Monatsb. Akad. Wiss. Berlin, 1869 (1870), p. 708.

Ruppelia prolongata, Castelnau—Res. Fish. Austr. (Vict. Rec. Philad. Exhib.), 1875, p. 29 (not *R. prolongata*, Cast., 1873).

Paraplesiops meleagris, Boulenger—Brit. Mus. Cat. Fish., 1895, p. 339.

A specimen from near Fremantle is in the Western Australian Museum, and another from the same locality was presented to the Australian Museum by Mr. A. Abjornssen. It is figured on plate I. (Reg. No. I. 11232).

Though the species has not been recognised from Western Australia under this name, there can be no doubt that the second specimen identified by Castelnau as *Ruppelia prolongata*, was really *P. meleagris*.

[1] Günther, *loc. cit.*

BOSTOCKIA HEMIGRAMMA, Ogilby.

PLATE X; FIG. 3.

Bostockia hemigramma, Ogilby—Proc. Linn. Soc. N. S. Wales, XXIV., 1899, p. 168.

The collection includes a small specimen of this species from the Helena River, near Perth, and two others from the same locality are in the Australian Museum. The largest of these, 155mm. long, is the one selected for illustration. I have compared it with a co-type in the museum collection, so that, although its proportions differ somewhat from the smaller ones described by Ogilby, I have no doubt of its correct identification.

EDELIA, Castelnau.

Edelia, Castelnau—Proc. Zool. Soc. Vic., II., 1873, p. 123 (*vittata*); *Id.*, Ogilby, Proc. Linn. Soc. N. S. Wales, XXIV., 1899, p. 175.

As all my specimens, including two examined by Ogilby, differ in some important details from that author's definition of this genus, I have drawn up the following corrected diagnosis. The items in brackets are as stated by Ogilby.

Body oblong, compressed. Scales, large, adherent, finely ciliated, concentrically striated. Lateral line interrupted below the second dorsal (complete), the tubes few, irregular, simple, extending along the entire exposed surface of the scale. Head moderate, largely scaly, snout and lower jaw naked. Mouth with small oblique cleft; jaws equal. Premaxillaries protractile; maxillary exposed at distal extremity only, naked. Bands of slender villiform teeth in the jaws, a large patch on the vomer, and a few on the anterior part of the palatines (not seen by Ogilby); pterygoids and tongue smooth. Nostrils distant, simple. Eyes moderate, lateral, high. Preorbital denticulate. Preopercle entire. Operculum with two spines. Gill-openings wide, the membranes united in front, free from the isthmus; 5-6 branchiostegals. Pseudobranchiae present. Gill-rakers moderate, few. Two dorsal fins connected at the base, the first with 7-8 spines and longer than the second; the

second with 1 spine and about 9 rays. Anal short, with 3 spines and about 8 rays. Ventrals inserted behind the base of the pectorals, close together, with a strong spine and 5 rays. Pectorals rounded, with 11-13 rays. Caudal slightly rounded. Vertebrae 13+15 (12+18).

This genus is evidently closely allied to *Nannoperca*, Günther.

EDELIA VITTATA, Castelnau.

PLATE X.; FIG. 2.

Edelia vittata, Castelnau—Proc. Zool. Soc. Vict., II., 1873, p. 124; *Id.* Ogilby, Proc. Linn. Soc. N. S. Wales, XXIV., 1899, p. 176.

Edelia viridis, Castelnau—*loc. cit.*, p. 125.

There are twenty specimens in the Australian Museum, of which two from the Leschenault Inlet were received from Mr. A. Abjornssen. Two more from Donnybrook, in the County of Wellington, were some of those used by Ogilby in drawing up his description, while sixteen others without a definite locality were received from Mr. Albert Gale.

GLAUCOSOMA HEBRAICUM, Richardson.

Glaucosoma hebraicum, Richardson—Voy. Ereb. and Terr., Fishes, 1846, p. 27, pl. XVII.; *Id.*, Saville Kent, Nat. in Austr., 1897, p. 177, pl. XXX.

Glaucosoma burgeri, Günther—Brit. Mus. Cat. Fish, I., 1859, p. 211 (part).

Fresh specimens of this species show striking dark longitudinal bands, the most prominent of which follows the lateral line, and is rather wider than the scales it covers. There are two broader ones between it and the back, each covering two rows of scales, while below it are three others which are still broader. A dark bar passes obliquely from the eye to the interopercle. The fins are dusky, but the tips of the anal and dorsal spines and the anterior margins of the fins are whitish, and there are oblique whitish bars on the ends of the caudal lobes.

Although I have carefully compared my two specimens with Jordan and Thompson's [1] excellent description and figure of *G. burgeri*, Richardson, I am unable to find any satisfactory differences

[1] Jordan and Thompson, Proc. U. S. Nat. Mus., XXXIX., 1911, p. 440.

between the two species that may not possibly be accounted for by variation with growth, etc. Both my specimens, however, have the fourth dorsal rays longest, so that the fins are angular in form instead of rounded. Minute palatine teeth are present in both, but are very indistinct and easily overlooked in one of them. As suggested by Jordan and Thompson, it will be necessary to compare specimens of both species before the characters separating the two can be positively determined.

Both specimens were obtained near Fremantle, W. Australia.

SILLAGO BOSTOCKII, Castelnau.

PLATE X., FIG. 1.

Sillago ciliata vel bostockii, Castelnau—Proc. Zool. Soc. Vict., II., 1873, p. 133.
Sillago bostockii, McCulloch—"Endeavour Report," fishes (in press), pp. 60, 63.

D. XI., 21-22; A. 19-22; P. 15-16; V. I., 5; C. 17; l. lat. 69-74; l. tr. 6+14.

Head $3\frac{1}{2}$-$3\frac{3}{4}$, depth 5-$5\frac{1}{2}$ in the length to the hypural. Eye 5-$5\frac{1}{2}$, snout $2\frac{2}{5}$, pectoral $1\frac{2}{3}$-$1\frac{3}{4}$ in the head. Interorbital width $\frac{2}{3}$-$\frac{3}{4}$ the eye.

Body elongate, compressed, the dorsal profile rather more arched than the ventral. Caudal peduncle much compressed, its depth almost equal to the postorbital portion of the head. Eye large, nearer the end of the operculum than the tip of the snout. Interorbital space flat. Preoperculum crenulate, a broad flat spine on the operculum. Mouth small, oblique, the maxillary a little longer than half the snout. Nostrils close together, near the eye, the anterior with a skinny lobe. A broad band of villiform teeth on each jaw, the outer ones of the upper jaw somewhat enlarged; a broad horseshoe shaped band on the vomer. Gill-rakers short and thick, tubercular below, nine on the lower limb of the first arch.

Scales finely ctenoid, extending forward to the nostrils on the upper surface of the head; arranged in four rows on the cheeks. Snout and lower part of the head bare. Basal portion of the caudal fin densely scaly, while rows of small scales are present behind each ray of the other fins. Lateral line a little arched anteriorly, thence straight to the caudal peduncle, and continued on to the fin to the end of the middle rays.

Dorsal fins separate or united by a low membrane; the first is inserted well behind the ventrals, the second just in advance of the vent and terminating far behind the anal. Pectoral and ventral pointed, the outer ray of the latter sometimes produced. Caudal emarginate.

Colour.—Sandy yellow, the upper parts closely speckled with minute grey dots. Both dorsal fins have from three to five longitudinal rows of large grey spots. Well preserved specimens have a dark (silvery?) band from above the base of the pectoral to the caudal peduncle. No dark mark at the base of the pectoral.

This is apparently the common whiting near Fremantle; a large number of specimens being included in the Western Australian Museum collection, while an excellent series was secured for the Australian Museum by Mr. Abjornssen. Specimen selected for illustration registered I. 11334.

THERAPON CAUDAVITTATUS, Richardson.

Datnia caudavittata, Richardson—Voy. Ereb. and Terr., Fishes, 1848, p. 24, pl. XVIII., fig. 3-5.

Therapon caudovittatus, Günther—Brit. Mus. Cat. Fish. I., 1859, p. 284; *Id.*, All. and Macl., Proc. Linn. Soc. N. S. Wales, I., 1877, p. 270; *Id.*, Macl. *loc. cit.*, II., 1878, p. 348; *Id.*, Castelnau, *loc. cit.*, III., 1878, pp. 42 and 47; *Id.*, Klunz. Sitzb. Ak. Wiss. Wien., LXXX., I., 1879, p. 350; *Id.*, Waite, Rec. Austr Mus., III., 1900, p. 210.

Therapon caudovittatus? vel bostockii, Castelnau.—Proc. Zool. Soc. Vict., II., 1873, p. 128.

I have examined nine specimens of this fish from Fremantle, W. Australia, and two from Murray Island, Torres Strait, but in none are the sub- and interoperculum serrated as described by Richardson. There are also 25 instead of 20 transverse series of scales, so that in both these details they agree better with his figure than his description.

Castelnau proposed the name *bostockii* for Fremantle specimens of *caudavittatus*, which differed from the description given by Günther in having the dorsal fin notched, and the last spines much shorter than the rays. This, however, is the normal form, and it is doubtful if Günther has correctly described his specimens.

SPARUS SARBA, Forskal.

Pagrus sarba (Forskal), Ogilby—Ed. Fish. N.S. Wales, 1893, p. 50, pl. XIV.
Chrysophrys sarba, Stead—Ed. Fish, N. S. Wales, 1908, p. 78, pl. XLVII.

Eight specimens are in the collection, from the neighbourhood of Fremantle, which agree in every way with others from Port Jackson. This species does not appear to have been recognised from the western coast of Australia.

SPARUS AUSTRALIS, Günther.

Chrysophrys australis, Günther—Brit. Mus. Cat. Fish. I., 1859, p. 494; *Id.*, Stead, Ed. Fish, N. S. Wales, 1908, p. 77, pl. XLVI.

I am unable to separate four specimens, from Fremantle, from this species. It has been recorded from the Harvey River, Western Australia, by Günther.

PLATAX TEIRA, Forskal.

Platax teria (Forskal), Jordan and Fowler—Proc. U. S. Nat. Mus., XXV., 1902, p. 256.

A very small specimen, one and a half inches long, from Fremantle, is of interest as being apparently the first of the species recognised from Western Australia.

LEPIDAPLOIS VULPINUS, Richardson.

Cossyphus vulpinus, Richardson—Proc. Zool. Soc., 1850, p. 71.
Harpe vulpina, Waite—Rec. Austr. Mus., IV., 1902, p. 269, pl. XLIII. and VI., 1905, p. 70.
Trochocopus rufus, Macleay—Proc. Linn. Soc. N. S. Wales, III., 1878, p 35, pl. V., fig. 3.
Cossyphus frenchii, Klunzinger—Sitzb. Akad. Wiss. Wien, LXXX., i., 1879, p. 400; *Id.*, Macleay, Proc. Linn. Soc. N. S. Wales, IX., 1884, p. 46.
Cossyphus aurifer, De Vis—Proc. Roy. Soc. Qld., I., 1884, p. 146.

The collection includes a specimen from Abrolhos Island, which agrees very well with Waite's figure of *Harpe vulpina*. I have compared it with the types of *Trochocopus rufus*, Macleay, with which it is identical. According to Mcleay's description there are 45 scales on the lateral line, but in both his specimens there are only 36. This detail is referred to by Klunzinger, and as *Trochocopus* has 45 or more, he placed the species in *Cossyphus*. Further,

there being already a *Cossyphus rufus*, and as he did not recognise its identity with the earlier *C. vulpinus*, he changed the name to *C. frenchii*.

Mr. Ogilby has kindly examined the type specimen in the Queensland Museum of *Cossyphus aurifer*, De Vis, for me, and writes that he considers it identical with the species figured by Waite.

PSEUDOLABRUS PARILUS, Richardson.

PLATE XII.

Tautoga parila, Richardson—Proc. Zool. Soc., 1850, p. 70.

Labrichthys parila, Castelnau—Proc. Zool. Soc. Vict., II., 1873, p. 137.

D. IX., 11.; A. III., 10; P. 13; V. I., 5; C. 12-13; l. lat. 26; l. tr. 3-4+9. Height $3\frac{1}{4}$ in the length to the hypural, and equal to the length of the head including the opercular flap. Eye 5, snout $3\text{-}3\frac{1}{2}$, caudal peduncle $1\frac{8}{10}$ in the head.

Body moderately elongate, compressed, covered with large scales which extend on to the nape and the caudal fin, but not over the bases of the dorsal and anal. A single series of small and imperfect scales from behind the eye to the cheek, and other large and irregular ones covering the operculum; head otherwise naked and closely pitted with minute pores. Preorbital narrower than the eye. A pair of strong canines in front of each jaw, those of the upper separated; sides with a single series of smaller canine-like teeth decreasing in size backwards, and a second inner series of very small ones anteriorly. Posterior canines present. Nostrils close together near the supero-anterior angle of the eye; the anterior tubular, posterior simple. Lateral line following the curve of the back over 20 scales, then bending downward, two rows to the middle of the caudal peduncle; the ramifications of the tubules cover all the exposed portions of the scales except the extreme edges.

Dorsal fin commencing above the hinder half of the operculum. Spines increasing in length backwards, the last $2\frac{3}{4}\text{-}3$ in the head, and each topped by a prolongation of the membrane. Soft portion of the pin angular behind, the anterior rays longer than the posterior; $2\frac{1}{4}$ in the head. Anal similar to, and terminating a little in advance of the dorsal. Pectoral $1\frac{3}{5}$ in the head, the upper rays longest, margin rounded. Ventral pointed, second ray not quite reaching to the vent. Caudal rounded.

Colour:—Greenish, spotted with brown, the spots tending to form indistinct bands in one specimen but not in the other. Brown lines radiate from the eye and on to the operculum. Broad darker markings enclosing light interspaces are distinct in one specimen on the lower parts of the head. Dorsal and anal with darker and lighter spots on the rays, and there is a larger spot between the first and second spines of the former.

Described from two specimens, 200 and 225mm. long, in the Australian Museum (I. 11459 and 11461), received from Mr. A. Abjornssen who collected them at Fremantle.

Castelnau recorded this species from Port Jackson,[1] but it has not been again recognised from eastern Australia by any other author. I suggest that his specimen was merely one of the variations of *P. gymnogenys*, Günther, as I have a local example of that species with which his colour-notes agree very well.

Having compared the specimens identified by Waite[2] as *P. ruber*, Castelnau, with the two described above, I think it possible that the former will prove to be either an older or sexual form of *P. parilus*. Though the differences between Waite's figure and my own appear very great, some of the specimens nevertheless exhibit certain characters which are intemediate between the two extremes, while Castelnau's notes on the colour of Western Australian examples of *P. parilus* agree as well with his own as with Richardson's species.

PSEUDOLABRUS BOSTOCKII, Castelnau.

PLATE XI ; FIG. 1.

Labrichthys tetrica, Günther—Brit. Mus. Cat. Fish, IV., 1862, p. 116 (part).

Labrichthys bostockii, Castelnau—Proc. Zool. Soc. Vict., II., 1873, p. 137; *Id.* Macleay, Proc. Linn. Soc. N. S. Wales, VI., 1881, p. 85.

Labrichthys biserialis, Klunzinger—Sitzb. Akad. Wiss. Wien, LXXX. I., 1879, p. 402.

Pseudolabrus tetricus, Waite—Rec. Austr. Mus., VI., 1905, p. 70 (*nec* Richardson)

D. IX., 11; A. III., 10; P. 12; V. I., 5; C. 13-14; l. lat. 25-27; l. tr. 4+8.

Height of body 3-3¼ in the length to the hypural, a little

[1] Castelnau, Proc. Linn. Soc. N. S. Wales, III., 1879, p. 389.

[2] Waite, Rec. Austr. Mus. IV., 1902, p. 185, pl. XXVIII.

greater than the length of the head without the opercular flap. Eye $4\frac{1}{2}$-5, snout 3, caudal peduncle $2\frac{1}{4}$ in the head. Interorbital width $1\frac{1}{2}$ in the snout.

Body moderately elongate, compressed, covered with large scales which extend forwards on to the nape, and on to the bases of the dorsal, anal, and caudal fins. Two oblique rows of small scales from behind the eye to the cheek, and other larger and irregular ones covering the operculum; head otherwise naked. Preorbital either a little broader than or narrower than the eye. A pair of strong canines in front of each jaw, those of the upper being widely separated; sides with a single series of smaller canine-like teeth decreasing in size backward, and usually a second inner series of very small ones anteriorly. Posterior canines present, sometimes double. Nostrils placed close together near the supero-anterior angle of the eye; the anterior tubular, posterior slit-like. Lateral line following the curve of the back over 19-20 scales, then bending downward two rows to the middle of the caudal peduncle; anteriorly the tubes are much branched, simpler posteriorly.

Dorsal fin originating over the hinder half of the operculum. Spines low, each topped by a prolongation of the membrane; rays subequal, soft portion of the fin angular posteriorly. Anal similar to the dorsal. Caudal truncate, the tips usually a little produced. Upper rays of pectoral longest, the lower half of the fin rounded. Ventrals pointed, not reaching to the vent.

Colour.—Red, darker above, each scale with a large carmine spot. A yellow band extends from above the base of of the pectoral to the middle of the caudal peduncle. Dorsal black basally, then clear orange, and margined with a narrow violet line. Anal blood red with a broad violet edge, and with or without indications of a darker median band. Caudal orange with a darker edge. Pectorals and ventrals pink, the former with a black basal band. After long preservation almost all traces of the colour markings disappear, leaving only the darker fin markings.

Described from six specimens, 160-200mm. long, one of which is from near Albany, another from Mandurah, and four from Fremantle. I am indebted to Mr. A. Abjornssen for beautifully preserved examples of this species from which the accompanying figure has been prepared.

I follow Klunzinger in regarding his *P. biserialis* distinct from *P. tetricus*, Richardson, but consider that it is identical with *P. bostockii*. Waite united the latter with *P. tetricus*, but they appear to differ in the arrangement of the scales on the cheeks and in the form of their fins.

MUCOGOBIUS, gen. nov.

Body oblong, compressed behind. Head a little compressed, scaleless, but with many horizontal and vertical raised mucous ridges, which also extend on to the body; no true barbels. Snout rounded, lower jaw the longer; mouth oblique. Eyes large, close together. Opercles unarmed. A band of simple villiform teeth in each jaw, the outer ones somewhat enlarged; vomer and palatines toothless. Tongue rounded. Isthmus broad. Scales moderate, largest posteriorly, cycloid. Dorsal with six spines and about ten rays. Anal similar to the soft dorsal. Ventrals I. 5, united, not adnate to the belly. Pectorals pointed, without free silk-like rays. Caudal rather lanceolate, produced.

Type.—*Gobius mucosus*, Günther.

MUCOGOBIUS MUCOSUS, Günther.

Gobius mucosus, (Günther), Waite—Rec. Austr. Mus., VI., 1906, p. 200.

The collection includes three from Fremantle, while another was collected by Mr. Abjornssen near Albany.

I am unable to associate this species with any genus known to me, and therefore propose *Mucogobius* for it as above.

SCORPAENA, Linnaeus.

Scorpaena, Linnaeus—Syst. Nat., 10th Ed., 1758, p. 266 (*porcus*); *Id.*, Jordan and Starks, Proc. U.S. Nat. Mus. XXVII., 1904, p. 131.

Sebastapistes, Gill, in Streets—Bull. U.S. Nat. Mus., No. 7, 1877, p. 62 (*strongia*); *Id.*, Jordan and Evermann, Bull, U.S. Fish., Comm., XXIII., pt. 1, 1905, p. 455.

The genus *Sebastapistes*, is apparently distinguished from *Scorpaena* only by the armature of the preorbital and its smaller size. Some large Australian species have strong recurved spines on the

preorbital, and being unable to satisfactorily divide up those I have examined into the two genera, I prefer to regard Gill's genus as a synonym of *Scorpaena*.

The following is a key to the Australian species available to me.

a. 50-55 rows of scales just below the lateral line. A more or less prominent median keel on the anterior portion of the interorbital space. *cardinalis.*

aa. 45 or fewer rows of scales.

b. Transverse hollow behind the eyes, distinct but shallow.

c. Two prominent interorbital ridges ending in spines. Third dorsal spine generally longest. *cruenta.*

cc. Interorbital ridges low, without spines. Fifth dorsal spine generally longest.

d. Head and body with numerous tentacles. *bynoensis.*

dd. Head and body with but few tentacles. var. *laotale.*

bb. Transverse hollow very deep. Interorbital ridges almost obsolete. *sumptuosa.*

SCORPAENA CARDINALIS, Richardson.

Scorpaena cardinalis, Richardson—Ann. Mag. Nat. Hist., IX., 1842, p. 212; *Id.*, Günther, Brit. Mus. Cat. Fish., II., 1860, p. 116.

Scorpaena jacksoniensis, Steindachner—Sitzb. Ak. Wiss. Wien., LIII., I., 1866, p. 438, pl. III., fig. 2, 2a.

Scorpaena cruenta, Ogilby—part, Ed. Fish, N S. Wales, 1893, p. 63, pl. XX.; *Id.*, Waite, Mem. Austr. Mus., IV., 1899, p. 99; *Id.*, Stead, Ed. Fish. N.S. Wales, 1908, p 108, pl. LXXV. (not *S. cruenta*, Richardson).

This species, and not *S. cruenta*, Richardson, is apparently the common Red Rock Cod of the Sydney fishermen. I have examined the specimens identified by Ogilby, Waite, and Stead as *cruenta*, and regard almost all of them as being *cardinalis*; only two small ones from Port Jackson being the former species. Mr. Stead informs me that there is but one common species in the Sydney Markets, of which his specimens are representative, so that *S. cruenta* will probably prove to be a rare species here. Besides the two Port Jackson specimens, I have examined several others from Tasmania, and find that they differ from *cardinalis* in having much larger scales, and in having the interorbital ridges ending in acute spines.

Günther[1] has united *S. jacksoniensis*, Steindachner, with *S. bynoensis*, Richardson, but Klunzinger[2] has shown that this is

[1] Günther, Zool. Rec., 1866 (1867), p. 143.

[2] Klunzinger, Sitzb. Ak. Wiss. Wien, LXXX. I., 1879, p. 366.

incorrect. It differs in the form and disposition of its cephalic spines, smaller scales, general proportions, and colouration. I can find no difference between it and *S. cardinalis.*

SCORPAENA SUMPTUOSA, Castelnau.

PLATE XIII.

Scorpaena sumptuosa, Castelnau—Res. Fish., Austr. (Vict. Offic. Rec. Philad. Exhib.), 1875, p. 17; *Id*, Macleay, Proc. Linn. Soc., N. S. Wales, V., 1881, p. 432.

D. XI., I. 9-10; A. III., 5; V. I. 5; P. 16; C. 13.

Depth $2\frac{1}{3}$-$2\frac{1}{2}$, head $2\frac{1}{2}$ in the length to the hypural. Eye 4-$4\frac{1}{3}$, caudal peduncle $3\frac{1}{4}$ in the head.

Dorsal profile highest at the base of the third dorsal spine, thence descending rapidly to the tail. Head armed with strong spines and largely covered with glandular skin, only a few scales being present on the end of the operculum. Interorbital space deeply concave with a very low median ridge anteriorly, and defined posteriorly by a raised sinuous bone. A deep transverse hollow behind the eyes divided into four parts by three longitudinal ridges, the two exterior of which have each a small spine in front. Eye with a broad spine anteriorly, and two on the upper margin. Nasal spines simple or bifurcate. Preorbital with a rosette of sinuous bony ridges. A ridge with three or four spines extends across the cheek, and there are two more on the preopercular margin on the same line; below these the margin is armed with four more points. Superior opercular spine inclined upwards, the lower extending forwards as a prominent curved ridge. There is a small bifurcate spine behind the eye, and two larger ones with broad bases between it and the upper opercular margin. Nuchals large, each with two points; a very small spine between them and the operculum. Maxillary extending beyond the eye, and two-thirds as wide as it posteriorly. Bands of villiform teeth on the jaws, vomer, and palatines. Gill-rakers short, thick, and spiny.

Scales large, cycloid, extending forward to just in front of the dorsal fin; six or seven between the lateral line and the twelfth dorsal spine, and about fifteen more to the vent. The lateral line is formed of about twenty-one tubes, and there are forty-four rows of scales directly below it. Skinny lobes are distributed at intervals all over the body, but are most numerous on the back and the lateral line.

First dorsal high, the third spine the longest and about two-thirds as long as the head; eleventh spine very short, one third as long as the twelfth. Anterior rays of the soft dorsal sub-equal, the margin rounded posteriorly. Second anal spine longest, very strong and laterally grooved; soft portion of the fin rounded. Pectoral reaching to, or not so far as the origin of the anal; it has nine or ten simple lower rays. Ventrals rounded, reaching to, or almost to the vent. Caudal rounded.

Colour.—Yellowish or reddish with darker marblings. Lower parts of the head and body with numerous irregular dark spots. Spinous dorsal marbled with reddish brown, and with or without a large dark blotch on the hinder part. Soft dorsal, caudal, and anal with red and brown spots forming irregular rows. Pectorals also spotted, ventrals plain.

Described from two specimens 310mm. and 300mm. long, the first from Fremantle, and the property of the Western Australian Museum, and the second from Albany, and in the collection of the Australian Museum. A third is also in the Australian Museum from Houtmans Abrolhos.

This species is allied to *S. cardinalis*, Richardson, but is at once distinguished by having only forty-four instead of fifty-five rows of scales below the lateral line, and in lacking the high median keel on the anterior part of the interorbital space. According to Castelnau his specimen had only ten spines in the first dorsal, but as this is an unusual number in the genus, and as my specimens agree in every other detail, I have no doubt that they are really *S. sumptuosa*.

SCORPAENA BYNOENSIS, Richardson.

Scorpaena bynoensis, Richardson—Voy. Ereb. and Terr., 184[illegible], p. 22, pl. XIV., fig. 3-4; *Id.*, Klunzinger—Sitzb. Ak. Wiss Wien., LXXX. I., 1879, p. 366 (synonymy).

Sebastapistes laotale, Jordan and Seale—Bull, U.S. Fish, Bur., XXV., 1906, p. 376, fig. 72 (variety).

I have very carefully compared thirty-two examples of this species from various localities and find that they vary considerably in the development of the tentacles and cirri on the head and body. In one from Dunk Island, Queensland, the orbital tentacles are nearly twice as long as the eye, and other large ones are present on

the spines and margins of the bones; in others from Murray Island, Torres Strait, all but the nasal tentacles are wanting. The first represents the form named *bynoensis*, while the others agree with *laotale*, of which I have examined a co-type, but as my series exhibits every stage between the two, the latter must be regarded merely as a variety of the former.

Of the thirty-two specimens, one has thirteen spines and nine dorsal rays, another eleven spines and ten rays, while all the rest have twelve spines and ten rays. The length of the posterior spine is variable, while the colour may be anything from ashy grey to brilliant brown and white, though the characteristic colour pattern is always more or less maintained.

My specimens come from Dunk Island and Green Island near Cairns, Queensland; Murray Island, Torres Strait; Mapoon, Gulf of Carpentaria; Port Darwin and Western Australia.

I regard the New South Wales and New Zealand records of this species as very probably incorrect since it is an inhabitant of coral reefs, etc., and is doubtless confined to the tropics. Günther's association of *S. jacksoniensis*, Steindachner, with *bynoensis* seems to have been the cause of its first inclusion in the New South Wales lists, but this is shown to be incorrect (see *ante*). Ogilby included it in his Edible Fishes of N. S. Wales,[1] but as there are no local specimens in the collection of the Museum, and as Mr. Stead informs me that he has not seen any specimens in the markets, I think its occurrence here needs verification.

S. bellicosa, Castelnau,[2] from Nicol Bay, Western Australia, and Queensland is apparently very similar to *S. bynoensis*, but is described as having prominent interorbital ridges, whereas they are low in Richardson's species. Castelnau's specimens may have been dried, as were many others in his collection, in which case the flesh shrinking from the bones would make the ridges appear more prominent, so that this difference is probably of little importance.

[1] Ogilby, Edible Fish, N. S. Wales, 1893, p. 65.

[2] Castelnau, Res. Fish., Austr. (Vict. Offic. Rec. Philad. Exhib.), 1875, p. 17.